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DESCRIPTION OF TWO NEW SPECIES OF *AMBLYCERUS* THUNBERG (COLEOPTERA: BRUCHIDAE) WITH A PROBABLE STRIDULATORY MECHANISM

CIBELE S. RIBEIRO-COSTA

Departamento de Zoologia, Universidade Federal do Paraná, C. P. 19020, 81.531-990, Curitiba, Paraná, Brazil (e-mail: stra@bio.ufpr.br)

Abstract.—***Amblycerus atypicus,* new species,** and ***A. ischiodontus,* new species,** are described and illustrated. The former has an area with overlapping scales in part of the external elytral margins and the inner distal portion of the hind femur with fine transverse striation. *Amblycerus ischiodontus* has an area transversely striate on the metepisternum and an apical tooth on the ventral margin of the hind femur. The areas on the elytra and metepisternum probably act as a file and the striate area or the tooth of the hind femur as the scraper. The elytro-femoral method of stridulation is postulated for the first time in Bruchidae and is shared with *Amblycerus cistelinus* (Gyllenhal), *A. jatayensis* (Pic), *A. sosia* Ribeiro-Costa and Kingsolver, *A. whiteheadi* Kingsolver and *A. guazumicola* Kingsolver and Johnson. The other kind, involving the metepisternum and hind femur, has already been described for three other *Amblycerus* species: *A. eustrophoides* (Schaeffer), *A. pollens* (Sharp), and *A. stridulator* Kingsolver, Romero N., and Johnson. A key for the bruchid species with modified body areas probably involved in stridulation is presented.

Key Words: *Amblycerus,* stridulation, taxonomy, Bruchidae

Kingsolver (1970) first recorded the presence of areas of the integument probably involved in stridulation in Bruchidae. He indicated the presence of a fusiform node with transverse striations on the metepisternum and the presence of an apical blunt tooth on the ventral margin of the hind femur for *Amblycerus eustrophoides* (Shaeffer), which has a distribution restricted to North America. Kingsolver et al. (1993) noticed the same stridulatory areas for *A. stridulator* described from Mexico, Costa Rica, and Venezuela and for *A. pollens* (Sharp) recorded from Belize, Costa Rica, and Brazil.

Amblycerus atypicus, n. sp. (French Guiana), has an area with overlapping scales on the external margins of the elytra and fine transverse striation on the inner distal portion of the hind femur. The other new species, *Amblycerus ischiodontus* (Brazil), has the metepisternum and hind femur with areas transversely striate, similar to those mentioned for *A. eustrophoides, A. pollens,* and *A. stridulator.* These areas for each species are in contact when the hind leg is moved, and, even though no sound emission has been perceptible from dead specimens, it is possible that they form a stridulatory mechanism. Since males and females of both species have these areas, I hypothesize that the mechanism probably is not related with courtship behavior.

The type of stridulation in *A. atypicus* can be characterized as the elytro-femoral method, established by Dumortier (1963). The area with overlapping scales on the elytron would be the "pars stridens" (file)

and the striate area of the hind femur, the "plectrum" (scraper). Dumortier (1963) cited the presence of the elytro-femoral method for the Coleopteran families Scarabaeidae, Lucanidae, Cerambycidae, Cicindelidae, Tenebrionidae, and Carabidae. This method of stridulation is hypothesized for the first time in Bruchidae and is shared with the following *Amblycerus* Thunberg species: *A. cistelinus* (Gyllenhal), *A. jatayensis* (Pic), *A. sosia* Ribeiro-Costa and Kingsolver, *A. whiteheadi* Kingsolver, and *A. guazumicola* Kingsolver and Johnson.

The methodology used for the descriptions follows Ribeiro-Costa (1997).

Amblycerus atypicus Ribeiro-Costa, new species

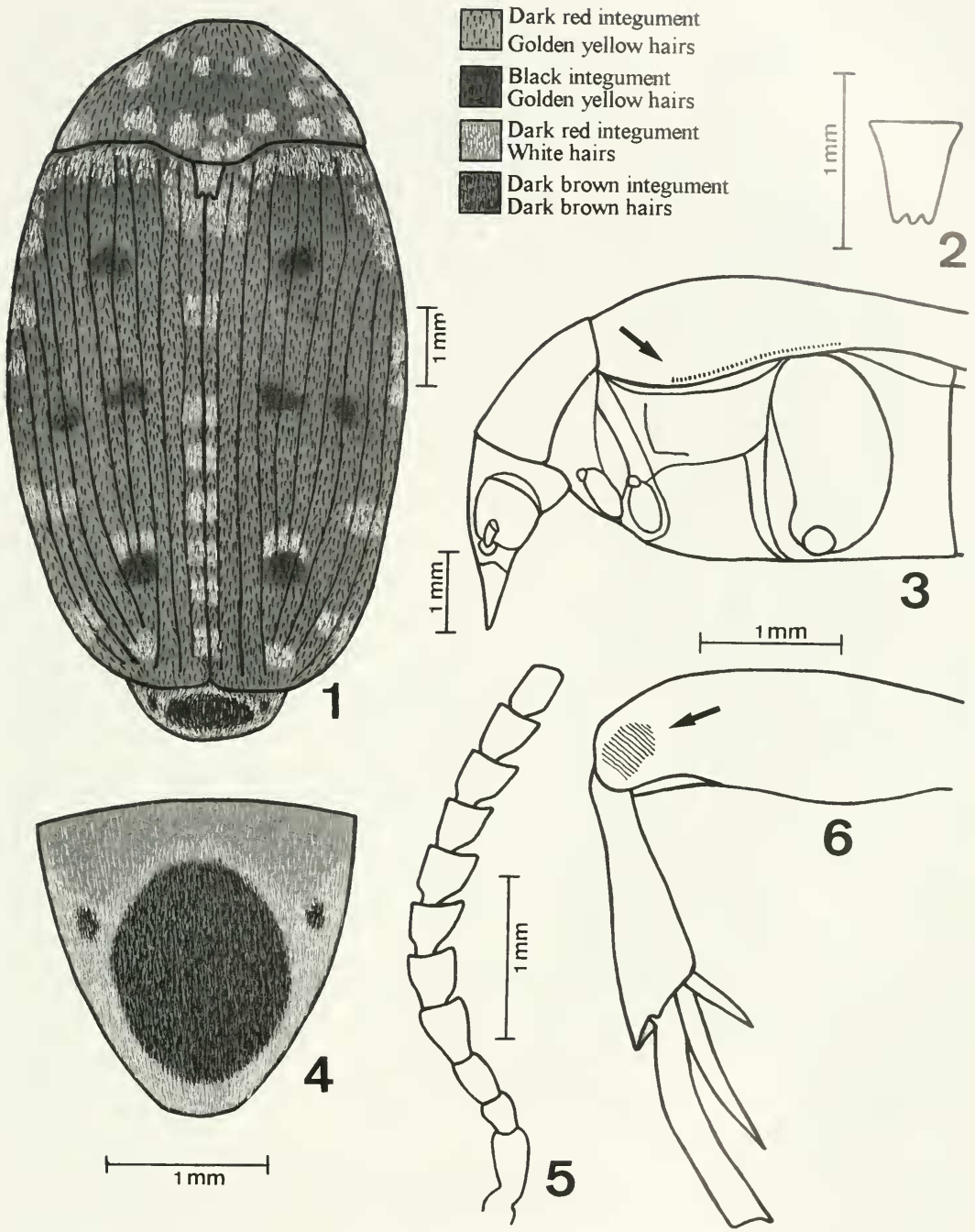
(Figs. 1–10)

Description.—*Measurements (pronotum + elytra):* Length 8.17–8.83 mm; width 4.83–5.17 mm.

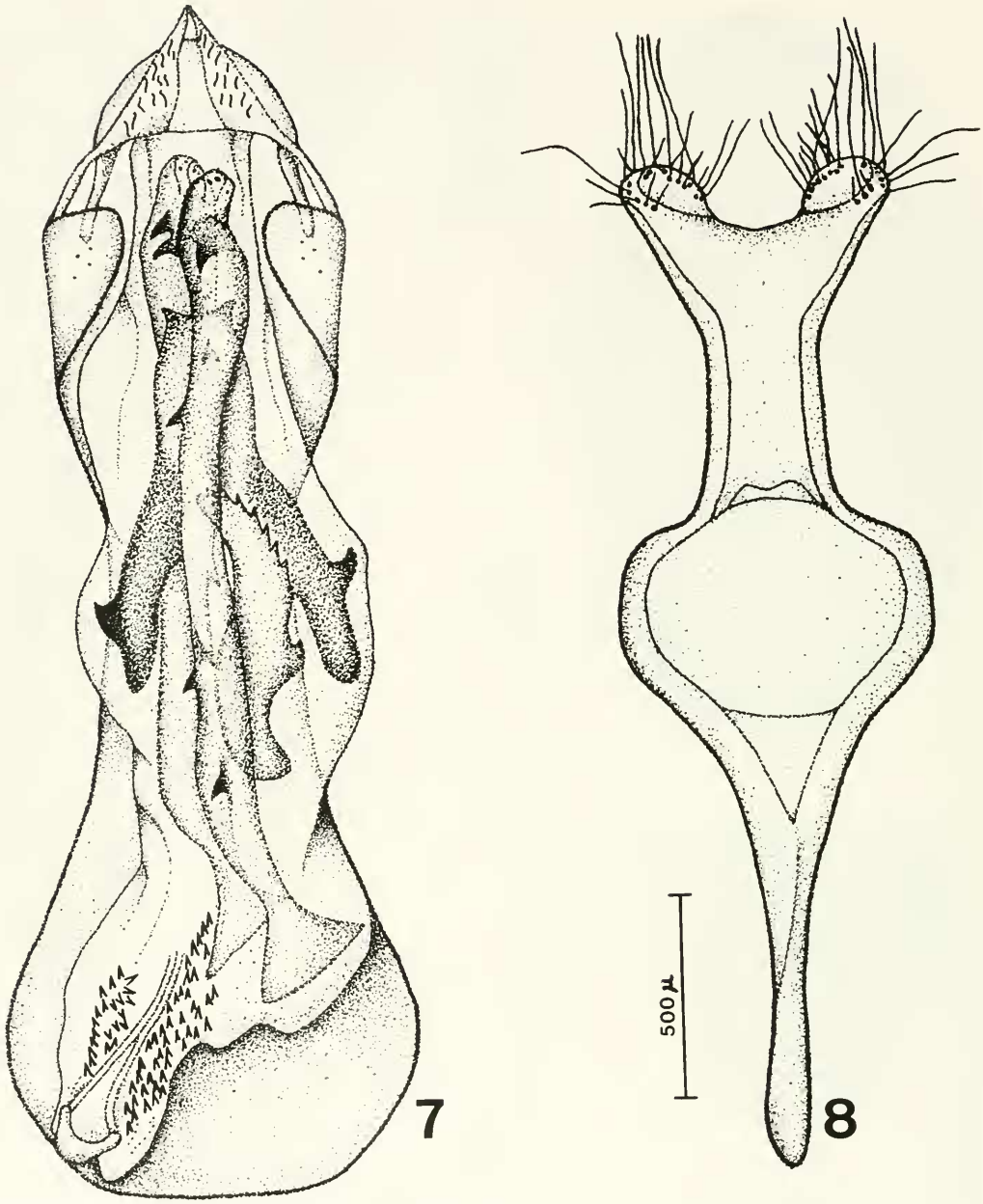
Integument: Antenna dark red. Dorsal surface (Fig. 1) dark red with scattered black spots on elytra, two on basal one-third, four at middle one-third and two on apical one-third. Lateral margins of elytra gently darker. Undersurface and legs dark red. Pygidium with large, ovate, central, dark brown spot (Fig. 4).

Vestiture: General coloration on dorsal surface golden yellow (Fig. 1). Pronotum with white setae forming six small, round spots arranged in triangle in middle lateral and scattered patches along basal lobe (Fig. 1). Scutellum usually white. Elytra (Fig. 1) with white setae in scattered patches along basal margin and around scutellum, often in a few small, irregular spots on median and external margins, in lines along interstitial margins and strial sulci, and condensed into a few, very small irregular patches on remainder of elytra. Pygidium (Fig. 4) with large, ovate, velvety dark brown spot, bordered with dense white setae and with two small patches of dark brown pillosity in anterolateral areas. Undersurface gently mottled brown and white. Lateral margins of abdominal sterna with white setae gently condensed into round patches.

Frons slightly flat, evenly punctate except on frontal carina. Eyes moderately faceted (3 ommatidia), protruding laterally; ocular index 3.9; ocular sinus 1/3.8 diameter of eye in lateral view; postocular lobe 1/9.5 times largest length of eye in lateral view. Antenna (Fig. 5) serrate from fourth to tenth segments, all gently longer than wide (1.1 times); last segment elliptical. Pronotum trapezoidal with lateral margins slightly arched in dorsal view, cervical sulcus present in lateral third, a sulcus outlining the emargination of basal lobe; long lateral carina, nearly reaching apex of pronotum, not forked anteriorly; surface densely punctulate, lateral one-third on either side also coarsely punctate. Prosternal process wide, margins sulcate, apex subacute, moderately expanded exceeding fore coxae and fitting into sulcate mesosternum. Scutellum (Fig. 2) about 1.9 times as long as wide, with tridentate apex. Elytra slightly convex in cross section along elytral suture, with an area with overlapping scales in part of the external margins (Fig. 9), truncated apically and with striae strongly impressed. Metepisternum with some punctures moderately, sparsely coarser; transverse axis of metepisternal sulcus (Fig. 3) strongly divergent from metapleural suture, very short longitudinal axis, less than half metepisternal length, not modified in a fusiform node with transverse striations (Fig. 3). Hind coxa with punctures moderately coarse and slightly dispersed, except in basal third. Hind femur (Fig. 6) 2.8 times as long as wide; apical tooth on ventral margin absent; internal face on distal portion with transverse striations (Figs. 6, 10). Hind tibia (Fig. 6) with coronal teeth approximately of same size; lateral spur 2.9 times length of median, first hind tarsal segment about 1.2 times as long as lateral spur and 3.6 times median spur; ventral face slightly convex with inconspicuous lines of punctures and setae in margins. Male pygidium vertical in lateral view, female oblique; male eighth



Figs. 1–6. *Amblycerus atypicus*. 1, Dorsal habitus. 2, Scutellum. 3, Lateral view of head and thorax. 4, Pygidium. 5, Antenna. 6, Hind leg.



Figs. 7–8. *Amblycerus atypicus*. 7, Male terminalia, median lobe. 8, Same, tegmen and lateral lobes.

tergite acute. Fifth visible abdominal sternum of female longer than that of male at middle, margin in both sexes entire.

Male terminalia (Figs. 7, 8): Eighth tergite acute apically. Median lobe (Fig. 7) with length 4.2 times its largest width in basal area; ventral valve moderately long, acute apically, with straight lateral margins; dorsal valve rounded. Basal area of internal sac (Fig. 7) without anterior and median sclerites; a pair of posterior tooth-like sclerites. Median region of internal sac (Fig. 7)

with two central, long laminar sclerites each with angulate apical portion and each one with one or two teeth near base, one subbasal and two on median portion; pair of sclerites laterad to laminars, longer than wide, each with one small curved tooth directed upward; unpaired median sclerite, 0.3 times as long as laminars, slightly sinuate in lateral view, with one side serrate. In apical area of internal sac (Fig. 7) one sclerite with long stems among many denticles. Tegmen with shallow emargination among enlarged lateral lobes (Fig. 8).

Discussion.—Romero et al. (1996) established the *cistelinus* group including *A. cistelinus, A. sosia,* and *A. guazumicola* mainly considering both the integument and pubescence pattern on the dorsal surface, not mentioning the presence of areas on elytra or hind femur possibly involved in stridulation. *Amblycerus atypicus* (French Guiana), *A. jatayensis* (Brazil) and *A. whiteheadi* (Panama, Nicaragua, Costa Rica, Colombia), probably will be included in this group (revisionary study currently underway) because they share characters cited by Romero et al. (1996) and also the areas on the external margins of the elytra with overlapping scales (Fig. 9) and transverse striation on the inner distal portion of hind femur (Fig. 10), which are apparently stridulatory in function.

Amblycerus atypicus is clearly separated from all the other *Amblycerus* species and especially from those in the *cistelinus* group by the form, number and arrangement of sclerites in the male internal sac (Fig. 7).

Types.—Holotype ♀. FRENCH GUIANA: Maroni River; Collection Wm Schaus, deposited in the National Museum Natural of History, Smithsonian Institution, Washington, D.C. U.S.A. One paratype ♂ with same label deposited in the Coleção de Entomologia Pe. Jesus S. Moure, Curitiba, Brazil.

Etymology.—The species name refers to the atypical elytro-femoral method of possible stridulation in *Amblycerus.*

Amblycerus ischiodontus Ribeiro-Costa, new species

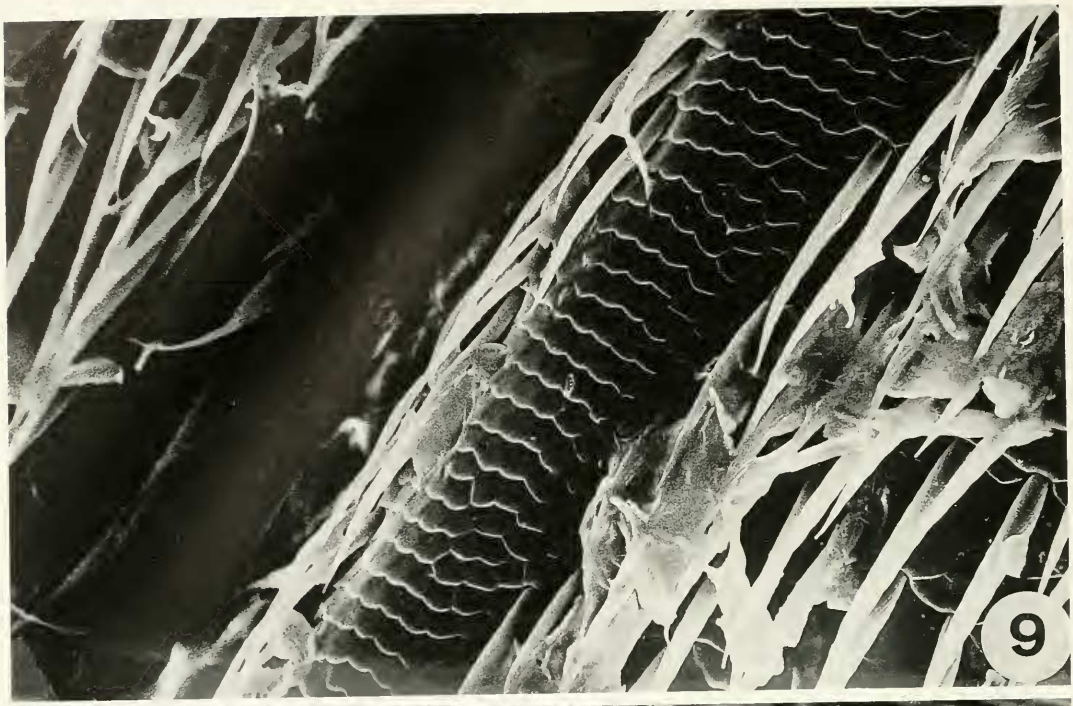
(Figs. 11–18)

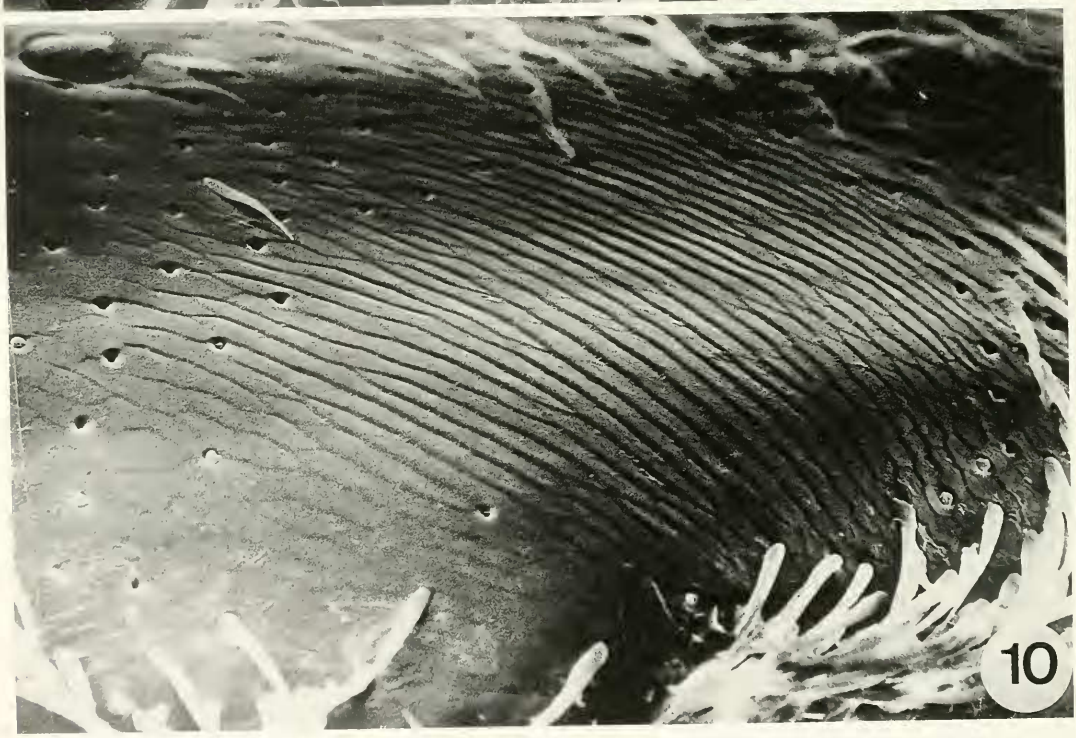
Description.—*Measurements (pronotum + elytra):* Length 4.48 mm; width 2.72 mm.

Integument: General coloration, dark red. Eyes, legs and undersurface of thorax darker.

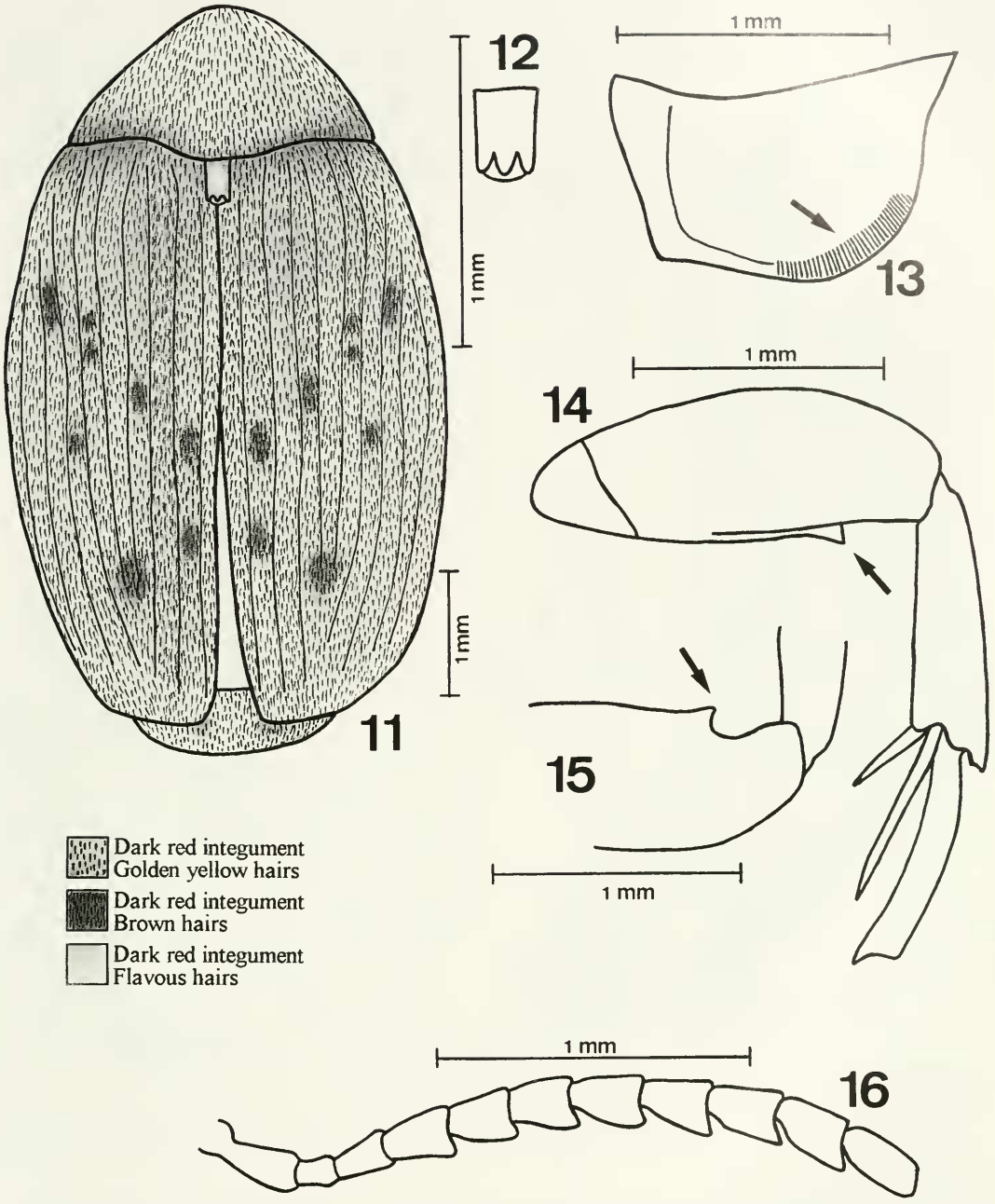
Vestiture: Head, appendages and ventral area of thorax and abdomen, flavous; metepisternum in part, golden yellow. Pronotum (Fig. 11) golden yellow rarely with small brown patches. Scutellum flavous. Elytra (Fig. 11) golden yellow; brown hairs in rare irregular patches and flavous hairs in lines along interstitial margins and strial sulci. Pygidium (Fig. 11) golden yellow with two small central, brown patches.

Frons slightly flat, evenly punctuated, frontal carina absent. Eyes moderately faceted (7 ommatidia), protruding laterally; ocular index 3.8; ocular sinus 1/5.0 diameter of eye in lateral view; postocular lobe 1/6.7 times largest length of eye in lateral view. Antenna (Fig. 16) serrate from fourth to tenth segments, all perceptibly longer than wide (1.4 times), last segment subelliptical. Pronotum trapezoidal with lateral margins moderately arched in dorsal view, cervical sulcus in lateral thirds and a sulcus outlining basal lobe; long lateral carina, nearly reaching apex of pronotum, not forked anteriorly; surface densely punctulate, lateral one-third either side also coarsely punctate. Prosternal process wide, not sulcate, apex subacute, moderately expanded between anterior coxae and fitting into sulcate mesosternum. Scutellum (Fig. 12) about 1.8 times as long as wide, apex strongly tridentate on rounded base. Elytra slightly convex in cross section along elytral suture, subtruncated apically and with striae strongly impressed. Transverse axis of metepisternum (Fig. 13) moderately divergent from metapleural suture; transversely striate and strongly curved area running with longitudinal axis, apparently being a modification



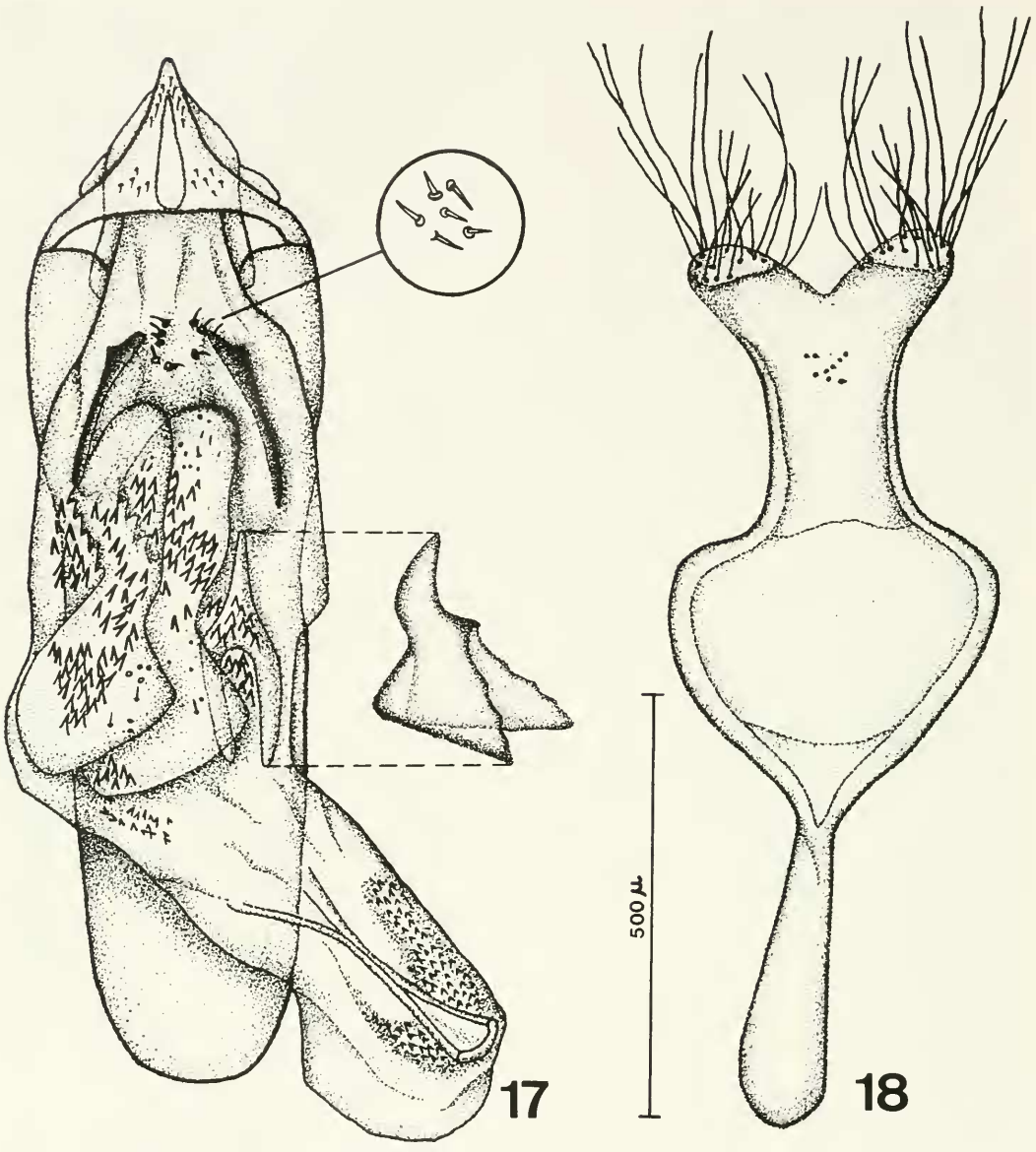


Figs. 9–10. *Amblycerus atypicus*. 9, Scanning electron micrograph (SEM) of the external margin of elytron showing "file." 10, SEM of the inner distal portion of the hind femur showing "scraper."



Figs. 11–16. *Amblycerus ischiodontus*. 11, Dorsal habitus. 12, Scutellum. 13, Metepisternum. 14, Hind leg. 15, Ventral margin of hind femur showing the tooth. 16, Antenna.

of it (Fig. 13). Hind coxa with coarse punctures slightly denser in distal half. Hind femur (Fig. 14) 2.3 times as long as wide and with tooth pronounced in distal portion of ventral margin (Fig. 15); internal face on distal region without transverse striations. Hind tibia (Fig. 14) with coronal denticles approximately of same size; lateral spur 2.4 times length of median, first hind tarsal segment 1.2 times as long as lateral spur and



Figs. 17–18. *Amblycerus ischiodontus*. 17, Male terminalia, median lobe. 18, Same, tegmen and lateral lobes.

2.8 times median spur; ventral face moderately convex with inconspicuous lines of punctures and setae in margins. Male pygidium vertical, round apically. Fifth visible abdominal sternum not emarginate in male. Female unknown.

Male terminalia (Figs. 17, 18): Eighth tergite rounded apically. Median lobe (Fig. 17) with length 3.8 times its largest width in basal area; ventral valve moderately long, acute apically, with concave lateral margins; dorsal valve subtriangular with straight lateral margins and rounded apex. Basal area (Fig. 17) of internal sac without anterior and median sclerites; a pair of posterior thin sclerites, prolonged and with a tooth sub-basally on one side. Median area of internal sac (Fig. 17) with a pair of lam-

inar sclerites, sinuous, serrate sub-basally, teeth approximate; unpaired sclerite in fork form 0.6 times as long as laminars, with moderately separate stems. In apical area of internal sac (Fig. 17) one sclerite with very long stems. Median and apical areas of internal sac with denticles near apical sclerite. Tegmen (Fig. 18) with moderate emargination in "V" between enlarged lateral lobes.

Discussion.—*Amblycerus ischiodontus* shares with *A. eustrophoides, A. pollens,* and *A. stridulator* an area of the metepisternum with transverse striations (Fig. 13) and an apical tooth on the ventral margin of the metafemur (Fig. 15). The study of all characters together did not show great affinity among the mentioned species. Differences are easily recognized in the patterns of pubescence, form of the striate area, and the sclerites in the male internal sac.

Kingsolver et al. (1993) commented that *A. pollens* is more similar to *A. eustrophoides* when compared with *A. stridulator.* Romero et al. (1996) included *A. eustrophoides* in the *alternatus* group along with *A. serieguttatus, A. alternatus,* and *A. schwarzi* and stablished the *stridulator* group only for *A. stridulator.*

Revisionary studies on Brazilian species under way indicate that *A. pollens* and *A. ischiodontus* are members of two distinct species groups, respectively.

According to Arrow (1904) the body area where the stridulatory mechanism is placed in Coleoptera can be the same in non-related groups, as it can be different in different members of the same group. According to him, there are Coleoptera with the two types of stridulatory mechanism placed in different parts of the body.

Amblycerus ischiodontus is easily separated from all other *Amblycerus* by its characteristic form and disposition of sclerites in the male internal sac (Fig. 17).

Type.—Holotype ♂. BRAZIL: Amazonas, Paraná do Xiboreninho, 03°15′S–06°00′W; 5 Aug. 79; mixed water; Canopy Fogging Project TRS#05, Tray 326 Adis, Erwin, Montgomery et al. collectors; deposited in the National Museum Natural of History, Smithsonian Institution, Washington, D.C., U.S.A.

Etymology.—The name of the species refers to the presence of a tooth on the ventral margin of the hind femur.

Key to *Amblycerus* Species with Areas of Integument Probably Involved in Stridulation

1. External margins of elytra partly with an area with overlapping scales (Figs. 3, 9); inner distal portion of hind femur with fine transverse striation (Figs. 6, 10); usually scattered black spots on elytra (Fig. 1); pygidium with large, ovate, velvety dark brown spot (Fig. 4) 2
– Elytra and hind femur without integumental modifications; patterns of coloration on elytra and pygidium otherwise 7
2. Elytra with white hairs vaguely mottled; very coarse punctures on lateral third of pronotum; male terminalia with four pairs of sclerites and one unpaired sclerite . . . . . *Amblycerus guazumicola* (Kingsolver and Johnson)
– Elytra usually with well marked white irregular spots on median and external margins and small irregular patches on remainder of elytra (Fig. 1); moderately coarse punctures on lateral third of pronotum; number of sclerites in internal sac of male terminalia otherwise 3
3. Male internal sac with three pairs of sclerites and one unpaired sclerite (Fig. 7) . . . . . *Amblycerus atypicus,* new species
– Male internal sac with two pairs of sclerites and one unpaired sclerite 4
4. Pair of laminar sclerites in male internal sac with tooth 5
– Pair of laminar sclerites in male internal sac smooth . . . . . *Amblycerus whiteheadi* Kingsolver
5. Male internal sac with basal pair of sclerite spine-shaped 6
– Male internal sac with basal pair of sclerite Y-shaped . . . . . *Amblycerus cistelinus* (Gyllenhal)
6. Male internal sac with unpaired median sclerite serrate basally along one side . . . . . *Amblycerus sosia* Ribeiro-Costa and Kingsolver
– Male internal sac with unpaired median sclerite with serration only on base . . . . . *Amblycerus jatayensis* (Pic)
7. Metepisternum with striate area transverse to metepisternal sulcus, apparently being a modification of metepisternum; apical portion of ventral margin of metafemur finely striate, with conspicuous tooth; pygidium with median line

. . . *Amblycerus stridulator* Kingsolver, Romero N., and Johnson

– Metepisternum with striate area running with longitudinal axis of metepisternal sulcus, apparently being a modification of it; apical portion of ventral margin of metafemur with conspicuous or inconspicuous smooth tooth; pygidium with or without median line 8

8. Apical portion of ventral margin of metafemur with one inconspicuous tooth; posterior end of metepisternum straight on striate area . . . . . *Amblycerus pollens* (Sharp)

– Apical portion of ventral margin of metafemur with one conspicuous tooth; posterior end of metepisternum curved on striate area 9

9. Posterior end of metepisternum gently curved on striate area; scutellum tridentate; pygidium with narrow median line . . . . . *Amblycerus eustrophoides* (Schaeffer)

– Posterior end of metepisternum strongly curved on striate area (Fig. 13); scutellum tridentate on round base (Fig. 12); pygidium otherwise . . . *Amblycerus ischiodontus*, new species

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